



GE-Housatonic River Rest of River Human Health Risk Assessment

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Topics

- What is the purpose of a Human Health Risk Assessment (HHRA)?
- What is a Human Health Risk Assessment?



Purpose of the HHRA

- Describe Risks
- Provide information that can be used to develop cleanup goals



Risk = Exposure + Toxicity

- ***Risk Assessment***
 - Method of determining potential health risk in absence of any cleanup
 - Considers current and future potential land use and activities



Risk Assessment



CLEANUP DECISION



Step 1 – Hazard Identification

- “Full suite” chemical analysis
- Site contaminants are:
 - PCBs
 - Dioxin-like PCBs
 - Dioxins and furans



Step 2 – Exposure Assessment

- Who might be exposed?
 - Children
 - Adults



Step 2 – Exposure Assessment

- How can people be exposed?
 - Ingestion
 - Dermal absorption
 - Eating foods





Step 2 – Exposure Assessment

- How much exposure depends on:
 - Concentration
 - Contact rate
 - How often exposed
 - How long exposed



Step 2 – Exposure Assessment

- Exposure Information
 - MA DPH survey
 - Field observations
 - Other waterbodies
 - EPA guidance



Step 2 – Exposure Assessment

- Average Exposure
 - Central Tendency Exposure (CTE)
- Highly Exposed Individual
 - Reasonable Maximum Exposure (RME)
- Current and future potential exposure are considered



Step 3 Toxicity Assessment

- Cancer effects
- Noncancer effects



Step 4 - Risk Characterization

- Risk Characterization
 - Combines Exposure and Toxicity Assessments
 - Describes risks numerically



Toxicity Assessment Cancer

- Quantitatively assessed:
 - PCBs
 - TEQ (Toxic Equivalence)
 - Dioxin-like PCBs + Dioxins + Furans
- Cancer Slope Factor (CSF)
 - estimate of potency



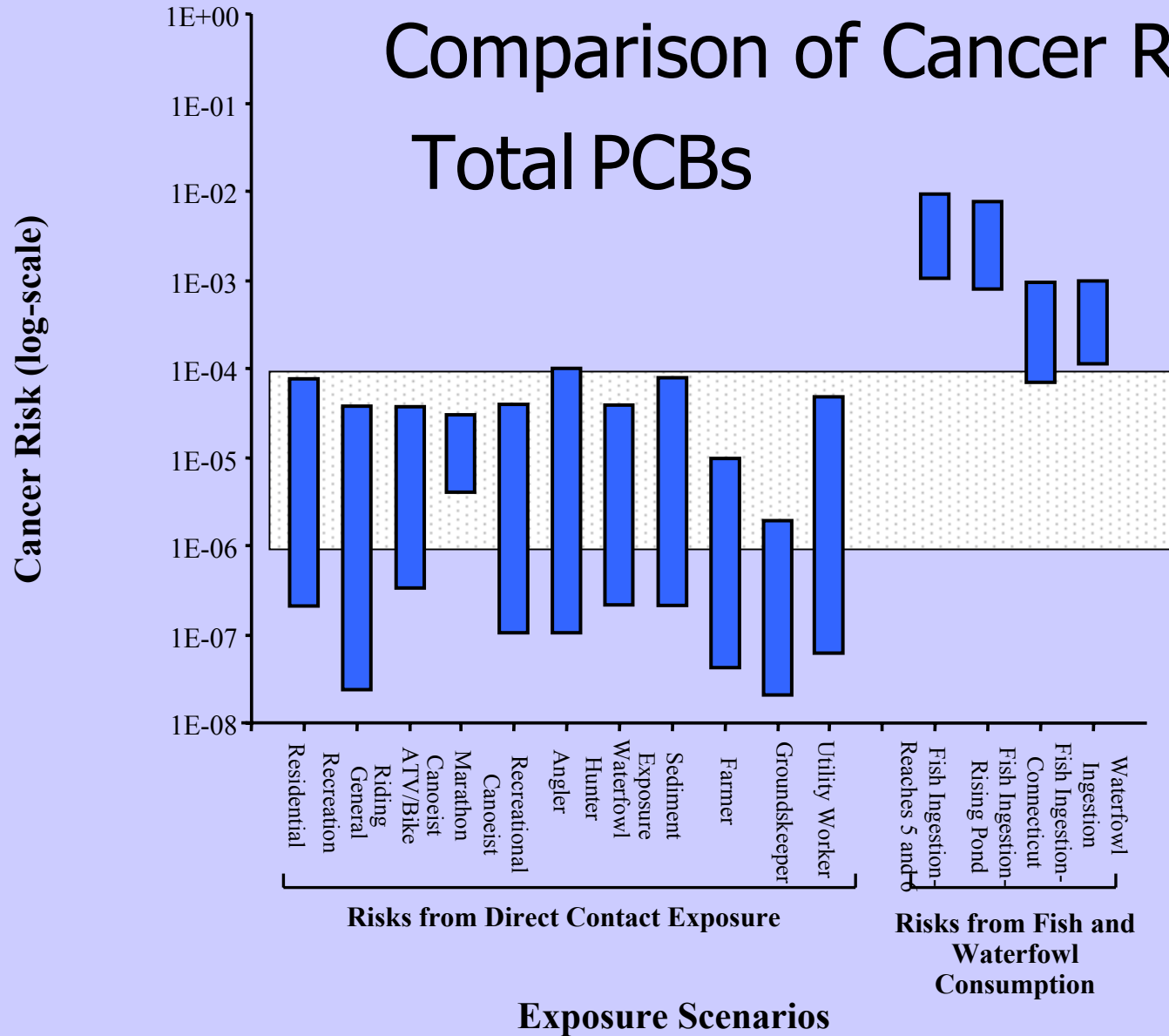
Risk Characterization

Cancer Risk

- Increased probability of getting cancer over a lifetime
 - Cancer slope factor x exposure dose
- Probability
 - 1 in a million chance
 - 1 in 1,000,000
 - 1E-06
 - 1×10^{-6}

Comparison of Cancer Risks

Total PCBs





Toxicity Assessment Noncancer

- Quantitatively assessed:
 - PCBs
- Reference Dose (RfD)
 - Level without appreciable risk



Risk Characterization Noncancer Hazard

- Compares site exposure to level without appreciable risk
- Hazard Index = $\frac{\text{site exposure}}{\text{Reference Dose}}$
- $HI \leq 1$, adverse effect unlikely

